Arid Zone Monitoring: Surveys for vertebrates across arid and semi-arid zones

Project Summary Project 3.2.5



National Environmental Science Programme

Project summary

Monitoring animal populations in Australia's sandy deserts is challenging. Desert species can be patchily distributed, at low densities, and have boom-bust cycles. As a result, we know little about the distribution, abundance, and status of desert wildlife. However, over the past decade many Indigenous ranger groups, desert ecologists, NGOs and government agencies have combined traditional Indigenous tracking skills with a scientific approach to data collection to survey wildlife and their threats, usually at a local scale.

Over the past decade or so, 7000 sandplot surveys have been carried out across almost two-thirds of Australia, by over 40 Indigenous and non-Indigenous groups. This project is working with these partners to collate and analyse this information, to produce a collective picture of the distributions of desert species and their threats, and how these are changing over time. The research will also provide guidance to groups on how to improve their monitoring programs so they are collecting the data they need to help them manage country.

The project will showcase the work carried out by Indigenous and other groups in Australian deserts, and lay the groundwork for creating ongoing, national-scale monitoring for desert wildlife.



lacqueline Shovellor, Karajarri ranger, checking tracks during a survey on the Karajarri IPA. Photo: Karajarri and Nicolas Rakotopare



Some of the animals that are detected in sandplot surveys, shown together with their track or sign. The project will collate data on many different kinds of animals, including threatened species, animals that are important to Indigenous groups and feral animals.





What this project builds on

As animals move across desert sands, they leave the story of who they are and what they are doing in their tracks, diggings and scats. People with the right skills can read these animal signs like words on a page. Many Indigenous Australians use this language expertly, to know where the goannas are fat and abundant, when bilby burrows are occupied, and where the emus are heading.

By blending these tracking skills with ecological science, this information can be collected in a standardised way and used to monitor the presence of animals across large areas, to track changes over time, and identify important environmental conditions for key species. The blended method that developed over ten years ago is the '2-hectare sandplot' survey (also called trackplot surveys, sign surveys, cybertrack surveys, or Tracks App surveys). The method involves searching a 2 ha area for a standard amount of time (or effort), recording all identifiable animal signs, and describing habitat characteristics.

Sandplot surveys have become very popular and are used widely. Some groups have surveyed with a rigorous sampling design to answer specific questions; other groups have used sandplot surveys for other reasons, such as an incentive for getting to long-unvisited parts of country, or to provide opportunities for people to share knowledge.

Sandplot surveys have been used across almost two-thirds of the continent, from the Dampier Peninsula in northwest Australia all the way to the South Australia–New South Wales border. Over 7000 surveys have been carried out by over 40 different groups and individuals, representing an incredible collective effort, but the data have never been brought together.

How will working together help?

The Arid Zone Monitoring project is an opportunity to gather this scattered data into a single database, which can then be used to create regional and national distribution maps of desert species and their threats, to understand what influences the presence of key species, and help to identify important areas for management actions. In some regions, the data could also be used to understand how the desert has changed over time, or how animals have responded to threat management.

From consultation with partners, we know that groups also want guidance on the design of their ongoing sandplot monitoring so that it can answer questions that are important to them locally.

Key questions that partners want the project to address include species inventory and habitat preferences (See what animals are there and where they live): identifying species declines (Are the animals finishing?); understanding relationships between species and resources (Know if animals have enough food); can sandplot surveys guide management intervention (To know where to hunt cats; See *if we should burn*); can sandplot surveys monitor rare species (How about sensitive species?); and guidance on method and sampling design (What about not writing down everything; How many surveys have we got to do?).

In the final year, the project will carry out field trials with ranger groups that are new to sandplot monitoring, using an approach to sampling design and data collection and recording that has been informed by consultation with partners and the results of analyses.

As well as filling many knowledge gaps about the distribution, trends and ecology of desert species, the project will also showcase and celebrate the management and monitoring work being carried out by many groups, especially Indigenous groups, across vast areas of Australia.

Towards the end of the project, in 2020, we will also scope the options and potential for transforming this two-year pilot project into an ongoing monitoring program for desert species.



Who is involved and where are they?

The TSR Hub project team is working with representatives from over 30 Indigenous Ranger groups and Indigenous organisations, eight non-government organisations and natural resource management groups, four state and federal government agencies, institutions like the Atlas of Living Australia and the Northern Australian Environmental Resources Hub, as well as individual experts. (see map below)

When is the research happening?

The project will run from mid 2018 to the end of 2020. The field trials will be carried out at selected sites in 2020.



Map shows the locations of project partners with sandplot data, with other partners listed on the bottom left.

Further Information

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Working with, and looking after data

Combining and analysing data from a large number of sources presents many technical challenges. We will need to find ways of dealing with variation in animal communities across such a large area, differences in the methods used and the types of data collected, and variability in the skill of the trackers and the quality of the data. Working through these challenges will help shape guidance to groups about ways to improve future data collection.

Spatial information for some species can be sensitive, and we need to present information in ways that keeps the source data confidential. For example, distribution maps for species, or graphs of changes over time won't show the sites where the data were collected.

Our approach to data management and presentation is set out in the data access agreements that are codeveloped with each data custodian who are partners in the project. BELOW: Examples of analysis of regional data from South Australia, contributed by many groups, to investigate the preferred habitat for ampurta, Dasycercus cristicauda, and whether the detection rate is changing over time.



This map shows areas where crest-tailed mulgara (ampurta) are likely to occur in dark blue. Predictive distribution maps like this can be built with presence (orange dots) and absence (yellow dots) information gathered in standardised surveys, then modelled against environmental conditions.



Where surveys have been repeated at the same sites over time, we can look at trends. This graph summarises the occurrence of ampurta in 2006 and 2013 at sites in South Australia which were surveyed in both years.



ABOVE: The distribution of the Emu in South Australia, based on the collective data from several groups; the information is presented in a way that doesn't reveal the locations of the sampling.



ABOVE: Changes over time in the detection rates of foxes at cats from many sites, sampled by several groups, in South Australia; showing how data can be presented without revealing the site locations of the sandplots.



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